

Urban Growth Modeling Using Neural Network Simulation: A Case Study of Dongguan City, China

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Dongguan is an important industrial city, located in the Pearl River Delta, South China. Recently, Dongguan city experienced a rapid urban growth with the locational advantage by transforming from traditional agricultural region to modern manufacturing metropolis. The urban transformation became usual change in China under the background of urbanization which belongs to one trend of globalization in the 21st century. This paper tries to analyze urban growth simulation based on remotely sensed data of previous years and the related physical and socio-economic factors and predict future urban growth in 2024. The study examines and compares the land use/cover (LUC) changes over time based on produced maps of 2004, 2009, and 2014. The results showed that water and forest area decreased since the past years. In contrast, the urban land increased from 2004 to 2014, and this increasing trend will continue to the future years through the urbanization process. Having understood the spatiotemporal trends of urban growth, the study simulated the urban growth of Dongguan city for 2024 using neural network simulation technique. The Kappa transition was calculated for the simulated map of 2014, and the value was approximately 0.5. Further, the figure of merit (FoM) of simulated map of 2014 map was 8.86%, which can be accepted in the simulation and used in the prediction process. Based on the consideration of water body and forest, the newly growth area is located in the west, northeast, and southeast regions of Dongguan city. The finding can help us to understand which areas are going to be considered into the future urban planning and policy by the local government.

Keywords: Neural Network Simulation, Dongguan City, Urban Growth